REMARKS/ARGUMENTS

Claims

Claims 13, 17-19, 21-23 and 25-29 are withdrawn from consideration. The Examiner rejected claims 1-12, 14-16, 20 and 24. By the present amendment claims 1, 4, 8 and 10 have been amended, and claims 2 and 3 have been cancelled. Therefore claims 1 and 4 - 29 remain pending in the application.

Information Disclosure Statement

In response to the Examiner's comments, an information disclosure statement (IDS) complying with 37 CFR 1.98 has been submitted under separate cover.

Discussion of the Obviousness Rejection

The Examiner rejected claims 1-12, 14-16 and 20 under Section 103(a) as being unpatentable over Oliver et al. (UK Patent Application Publication 2261248 A). This rejection is respectfully traversed.

In the present Office Action, the Examiner alleges that Oliver et al. disclose a channel-shaped structural beam comprising all of the features of the present claims. Further, the Examiner states that "the dimensions would have been a matter of design choice and the beam of Oliver et al. would operate equally well with any desired dimensions." However, the Applicant emphatically disagrees. For the reasons which wil be presented below, including the evidence in the attached declaration under 37 CFR 1.132, Applicants will demonstrate that a beam having the shape and dimensional ratios defined by the present claims exhibits significant, unexpected beneficial results compared to beams of a similar shape but with different dimensional ratios.

For subject matter defined by a claim to be considered obvious, the Office must demonstrate that the differences between the claimed subject matter and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."35 U.S.C. § 103(a); see also Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966). The ultimate determination of whether an invention is or is not obvious based on certain factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art, and (4), objective evidence of nonobviousness. Graham, 3838 U.S. at 17-18, 148 U.S.P.Q. at 467.

Consideration of the aforementioned Graham factors here indicates that the present invention, as defined by the amended pending claims, is unobvious in view of the cited references.

In support of the Applicants' assertions regarding the state of the prior art, and of non-obviousness of the present amended claims in light of the cited prior art, attached to Applicants' Reply is Declaration under 37 CFR §1.132 by Ross Ian Dempsey, a co-inventor, and an expert in the structural and mechanical engineering arts.

Regarding the scope and content of the prior art, the background sections of both the Applicants' specification, and the attached Declaration, outline the diverse range of prior art structural members and beams that have widely varying configurations. Such prior art includes numerous hollow flanged members. Most of these members were designed with a specific end use in mind, e.g., use as a ladder stile or as a roof truss, and some were designed as general purpose beams to replace, e.g., conventional hot rolled I-beams. Nevertheless, at the time of filing Applicants' present application, nothing in the prior art taught, suggested, or would have directed

one skilled in the art to, a beam having the particular shape and dimensional ratios of the present claims.

For purposes of the present analysis, Applicants consider that the level of ordinary skill in the art can be considered to be reasonably high, such that a person of ordinary skill in the relevant art would have an advanced degree in materials science and/or structural engineering, as well as several years of experience in the relevant field.

With regard to the differences between Applicants' claimed invention and the prior art, Applicants respectfully point out that the structural components of Oliver et al. have significantly different shapes than the shape of the beam of Applicants' claimed invention. For example, the hollow bodies (13, 14) of Oliver et al. are not rectangular. In contrast, the flanges (3) of the beams of Applicants' invention are substantially rectangular. (See, e.g., FIG. 1.) The unique shape, including the substantially rectangular flanges, of Applicants' beam results in significant functional advantages. For example, as shown in FIG. 20, fasteners (134, 135) can be conveniently and uniformly positioned in the substantially rectangular flanges. An advantage of Applicants' present invention is that structural components adjacent to the beam of the present invention can be securely supported by the flat surfaces of the rectangular flanges in this embodiment. For example, as shown in FIG. 20 of the present application, a second hollow flange channel 120 and an angle bracket 133 can abut the flat sides of a flange 128 of a first hollow flange channel 127.

Claim 1 has been amended to clarify some of the significant differences in shape between the structural components of Oliver et al., and the beam of the present invention. Support for Applicants' amendments is clearly provided, for example, in FIG. 1 and in paragraph [0079] of the specification as originally filed. Thus no new matter has been added. Furthermore, claim 1 has been amended to recite all of the limitations of dependent claims 2 and 3, which have now been canceled.

In the attached Declaration, the data show that section bending efficiencies are unexpectedly optimized in beams having the dimensional ratios of Applicants' claims (Declaration at page 8). Bending efficiency is defined as the effective section modulus (Z_e) over the cross-sectional area of the section (A). The cross-sectional area (A) is directly proportional to the mass of a beam and hence is also directly proportional to the cost of a beam (Declaration at page 9). In particular, Figure 7 in the attached declaration illustrates that a beam of the present invention has optimal bending efficiency where a ratio of the width of each flange to the thickness of the web is within a range from 15 to 50 as defined in claim 1 (Declaration at page 11). Also, Figure 8 illustrates that a beam of the present invention has optimal bending efficiency where a ratio of the width of each flange and the depth of the beam between opposite outer faces of the flanges is within a range from 0.2 to 0.4 as defined in claim 1 (Declaration at page 12).

The optimized section bending efficiencies demonstrated using Applicants' claimed dimensional ratios would have been unexpected to one having ordinary skill in the art at the time of filing of the present application. As stated in the attached declaration: "The data are based on extensive numerical investigation, testing, and experience.... These geometric proportions would not have been obvious to an ordinary person skilled in the art at the time of filing of the present application, because hollow flange channels having a shape as defined in the present claim 1 had not previously been considered for application as general purpose beams. The absence of any technical literature, standards or performance data concerning this type of section prior to the filing of the present patent application attests to this" (Declaration at pages 13-14).

Considering all of the Graham factors together, it is clear that the Applicants' invention, as presently claimed, would not have been obvious to one of ordinary skill in the art, at the relevant time, in view of the Oliver et al. reference

Furthermore, a rationale to support a conclusion that a claim would have been obvious requires that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 408, 82 U.S.P.Q.2d 1385, 1395 (2007);

Applicants' submit that the improved beam of Applicants' present invention, with the claimed ratios as now recited in amended claim 1, define a beam that has significant, unexpected beneficial results. As discussed in detail in the attached declaration under 37 CFR §1.132, a beam defined by amended claim 1 exhibits superior and unexpected bending efficiencies over the cited prior art.

Based on the data shown by Applicants in the attached Declaration, one of ordinary skill in the art, at the time the invention was made, would not have had a reasonable expectation of success in preparing the beam of Oliver et al. using the ratios defined by Applicants. The Examiner has presented no evidence that one of ordinary skill in the art would have known, or reasonably predicted, that improved structural performance could be achieved by modifying the beam of Oliver et al., with the dimensions claimed by Applicants, to arrive at Applicants' present invention. As such, Applicants' claimed invention cannot be *prima facie* obvious, and Applicants respectfully request withdrawal of this rejection.

The Examiner also rejected claim 24 under 35 U.S.C. §103(a) as unpatentable over Oliver et al., in view of USP 2,264,897 to Becker et al. The Examiner states that Oliver et al. teach Applicants' all the features of Applicants' claimed invention, except that it does not teach having a corrosion resistant coating. Becker et al. is offered by the Examiner for teaching sheet steel having a corrosion resistant coating. The Examiner therefore asserts that it would have been obvious to one of ordinary

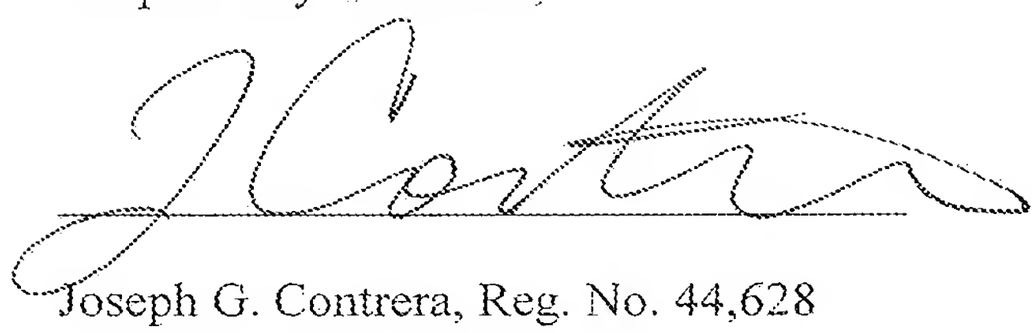
skill in the art, at the time Applicants' invention was made, to provide the corrosion resistant coating of Becker et al. to the beam of Oliver et al. because one of ordinary skill in the art would have been motivated to supply such a coating to weatherproof the beam of Oliver et al. Applicants respectfully traverse this rejection.

As Applicants have stated above, the teachings of Oliver et al. do not teach each and every element of Applicants' claimed invention. Specifically, Oliver et al. do not teach a beam having substantially rectangular flanges with the ratios defined in Applicants' amended claim 1. This defect is not cured with the addition of the teachings of Becker et al. The combination of Oliver et al., in view of Becker et al., still does not teach a beam having substantially rectangular flanges with the ratios defined in Applicants' amended claim 1. As such, Applicants' claimed invention cannot be *prima facie* obvious, and Applicants respectfully request withdrawal of this rejection.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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